IN THE CLAIMS:

1-19. (Cancelled).

20. (Currently amended) An isolated modified human chorionic gonadotropin (hCG) protein comprising an ~~at least one~~ electrostatic charge altering mutation in a β hairpin loop structure of a human chorionic gonadotropin (CG) β subunit, wherein the ~~at least one~~ electrostatic charge altering mutation is in the L1 β hairpin loop at a position ~~selected from the group consisting of positions 1-37 or 58-87~~ position 13 as shown in SEQ ID NO:3, wherein the mutation is a basic residue introducing mutation ~~wherein the at least one electrostatic charge altering mutation comprises at least one basic residue introducing mutation selected from the group consisting of S1B, E3B, P4B, L5B, P7B, R8B, C9B, P11B, I12B, N13B, A14B, T15B, L16B, A17B, V18B, E19B, G22B, C23B, V25B, C26B, I27B, T28B, V29B, N30B, T31B, T32B, I33B, C34B, A35B, G36B, Y37B, Y59B, D61B, V62B, F64B, S66B, I67B, P70B, P73B, V76B, N77B, V80B, S81B, Y82B, A83B, V84B, A85B, L86B, and S87B, wherein B is a basic amino acid residue, or wherein the at least one electrostatic charge altering mutation comprises at least one acidic residue introducing mutation selected from the group consisting of S1Z, K2Z, P4Z, L5Z, R6Z, P7Z, R8Z, C9Z, R10Z, P11Z, I12Z, N13Z, A14Z, T15Z, L16Z, A17Z, V18Z, K20Z, C23Z, P24Z, V25Z, C26Z, I27Z, T28Z, V29Z, N30Z, T31Z, T32Z, I33Z, C34Z, A35Z, G36Z, Y37Z, Y59Z, R60Z, V62Z, R63Z, F64Z, S66Z, I67Z, P70Z, G71Z, C72Z, P73Z, R74Z, G75Z, V76Z, V79Z, V80Z, S81Z, Y82Z, A83Z, V84Z, A85Z, I86Z, and S87Z wherein Z is an acidic amino acid residue, or wherein the at least one electrostatic charge altering mutation comprises at least one neutral residue introducing mutation selected from the group consisting of K2U, E3U, R10U, E19U, E21U, R60U, D61U, R63U, E65U, and R68U wherein U is a neutral amino acid~~, and wherein said mutation results in said hCG protein exhibiting increased hCG bioactivity.

21-142. (Cancelled)

143. (Withdrawn) The protein according to claim 20 further having at least one mutation not in the β hairpin loop structure, and the at least one mutation is selected from the group consisting of C38J, P39J, T40J, M41J, T42J, R43J, V44J, L45J, Q46J, G47J, V48J, L49J, P50J, A51J, L52J, P53J, Q54J, V55J, V56J, C57J, C88J, Q89J, C90J, A91J, L92J, C93J, R94J, R95J, S96J, T97J, T98J, D99J, C100J, G101J, G102J, P103J, K104J, D105J, H106J, P107J, L108J, T109J, C110J, D111J, D112J, P113J, R114J, F115J, Q116J, D117J, S118J, S119J, S120J, S121J, K122J, A123J, P124J, P125J, P126J, S127J, L128J, P129J, S130J, P131J, S132J, R133J, L134J, P135J, G136J, P137J, S138J, D139J, and T140J, wherein the variable J is any amino acid whose introduction results in an increase in the electrostatic interaction between an L1 and L3 β hairpin loop structure of the hCG β-subunit and a receptor with affinity for a dimeric protein containing the mutant hCG β-subunit monomer.

144. (Withdrawn) The protein according to claim 143, wherein the mutation is C38J.

145. (Withdrawn) The protein according to claim 143, wherein the mutation is P39J.

146. (Withdrawn) The protein according to claim 143, wherein the mutation is T40J.

147. (Withdrawn) The protein according to claim 143, wherein the mutation is M41J.

148. (Withdrawn) The protein according to claim 143, wherein the mutation is T42J.

149. (Withdrawn) The protein according to claim 143, wherein the mutation is R43J.

150. (Withdrawn) The protein according to claim 143, wherein the mutation is V44J.

151. (Withdrawn) The protein according to claim 143, wherein the mutation is L45J.

152. (Withdrawn) The protein according to claim 143, wherein the mutation is Q46J.

153. (Withdrawn) The protein according to claim 143, wherein the mutation is G47J.

154. (Withdrawn) The protein according to claim 143, wherein the mutation is V48J.

155. (Withdrawn) The protein according to claim 143, wherein the mutation is L49J.

156. (Withdrawn) The protein according to claim 143, wherein the mutation is P50J.

157. (Withdrawn) The protein according to claim 143, wherein the mutation is A51J.

158. (Withdrawn) The protein according to claim 143, wherein the mutation is L52J.

159. (Withdrawn) The protein according to claim 143, wherein the mutation is P53J.

160. (Withdrawn) The protein according to claim 143, wherein the mutation is Q54J.

161. (Withdrawn) The protein according to claim 143, wherein the mutation is V55J.

162. (Withdrawn) The protein according to claim 143, wherein the mutation is V56J.

163. (Withdrawn) The protein according to claim 143, wherein the mutation is C57J.

164. (Withdrawn) The protein according to claim 143, wherein the mutation is C88J.

165. (Withdrawn) The protein according to claim 143, wherein the mutation is Q89J.

166. (Withdrawn) The protein according to claim 143, wherein the mutation is C90J.

167. (Withdrawn) The protein according to claim 143, wherein the mutation is A91J.

168. (Withdrawn) The protein according to claim 143, wherein the mutation is L92J.

169. (Withdrawn) The protein according to claim 143, wherein the mutation is C93J.

170. (Withdrawn) The protein according to claim 143, wherein the mutation is R94J.

171. (Withdrawn) The protein according to claim 143, wherein the mutation is R95J.

172. (Withdrawn) The protein according to claim 143, wherein the mutation is S96J.

173. (Withdrawn) The protein according to claim 143, wherein the mutation is T97J.

174. (Withdrawn) The protein according to claim 143, wherein the mutation is T98J.

175. (Withdrawn) The protein according to claim 143, wherein the mutation is D99J.

176. (Withdrawn) The protein according to claim 143, wherein the mutation is C100J.

177. (Withdrawn) The protein according to claim 143, wherein the mutation is G101J.

178. (Withdrawn) The protein according to claim 143, wherein the mutation is G102J.

179. (Withdrawn) The protein according to claim 143, wherein the mutation is P103J.

180. (Withdrawn) The protein according to claim 143, wherein the mutation is K104J.

181. (Withdrawn) The protein according to claim 143, wherein the mutation is D105J.

182. (Withdrawn) The protein according to claim 143, wherein the mutation is H106J.

183. (Withdrawn) The protein according to claim 143, wherein the mutation is P107J.

184. (Withdrawn) The protein according to claim 143, wherein the mutation is L108J.

185. (Withdrawn) The protein according to claim 143, wherein the mutation is T109J.

186. (Withdrawn) The protein according to claim 143, wherein the mutation is C110J.

187. (Withdrawn) The protein according to claim 143, wherein the mutation is D111J.

188. (Withdrawn) The protein according to claim 143, wherein the mutation is D112J.

189. (Withdrawn) The protein according to claim 143, wherein the mutation is P113J.

190. (Withdrawn) The protein according to claim 143, wherein the mutation is R114J.

191. (Withdrawn) The protein according to claim 143, wherein the mutation is F115J.

192. (Withdrawn) The protein according to claim 143, wherein the mutation is Q116J.

193. (Withdrawn) The protein according to claim 143, wherein the mutation is D117J.

194. (Withdrawn) The protein according to claim 143, wherein the mutation is S118J.

195. (Withdrawn) The protein according to claim 143, wherein the mutation is S119J.

196. (Withdrawn) The protein according to claim 143, wherein the mutation is S120J.

197. (Withdrawn) The protein according to claim 143, wherein the mutation is S121J.

198. (Withdrawn) The protein according to claim 143, wherein the mutation is K122J.

199. (Withdrawn) The protein according to claim 143, wherein the mutation is A123J.

200. (Withdrawn) The protein according to claim 143, wherein the mutation is P124J.

201. (Withdrawn) The protein according to claim 143, wherein the mutation is P125J.

202. (Withdrawn) The protein according to claim 143, wherein the mutation is P126J.

203. (Withdrawn) The protein according to claim 143, wherein the mutation is S127J.

204. (Withdrawn) The protein according to claim 143, wherein the mutation is L128J.

205. (Withdrawn) The protein according to claim 143, wherein the mutation is P129J.

206. (Withdrawn) The protein according to claim 143, wherein the mutation is S130J.

207. (Withdrawn) The protein according to claim 143, wherein the mutation is P131J.

208. (Withdrawn) The protein according to claim 143, wherein the mutation is S132J.

209. (Withdrawn) The protein according to claim 143, wherein the mutation is R133J.

210. (Withdrawn) The protein according to claim 143, wherein the mutation is L134J.

211. (Withdrawn) The protein according to claim 143, wherein the mutation is P135J.

212. (Withdrawn) The protein according to claim 143, wherein the mutation is G136J.

213. (Withdrawn) The protein according to claim 143, wherein the mutation is P137J.

214. (Withdrawn) The protein according to claim 143, wherein the mutation is S138J.

215. (Withdrawn) The protein according to claim 143, wherein the mutation is D139J.

216. (Withdrawn) The protein according to claim 143, wherein the mutation is T140J.

217. (Withdrawn) The protein of claim 20, wherein said protein further comprises a basic amino acid residue introducing mutation N58B, wherein B is a basic amino acid residue.

218. (Withdrawn) The protein of claim 20, wherein said protein further comprises a basic amino acid residue introducing mutation L69B, wherein B is a basic amino acid residue.

219. (Withdrawn) The protein of claim 20, wherein said protein further comprises an acidic residue introducing mutation N58Z, wherein Z is an acidic amino acid residue.

220. (Withdrawn) The protein of claim 20, wherein said protein further comprises an acidic residue introducing mutation L69Z, wherein Z is an acidic amino acid residue.

221. (Previously presented) The protein of claim 20, wherein the increased hCG bioactivity is increased progesterone production.

222. (New) The protein of claim 20, wherein the basic residue introducing mutation introduces a basic amino acid selected from the group consisting of arginine, histidine, and lysine.